

COPPER**Hardness Dependent Maximum Daily Effluent Limitations (MDELs) and Average Monthly Effluent Limitations (AMELs)
Calculation Spreadsheet**

Water Hardness* (mg/L as CaCO ₃)	CMC¹ (acute) 1-hour Average (ug/L, dissolved)	CCC² (chronic) 4-day Average (ug/L, dissolved)	ECA_{acute}³ (ug/L, total recoverable)	ECA_{chronic}⁴ (ug/L, total recoverable)	LTA_{acute}⁵ (ug/L, total recoverable)	LTA_{chronic}⁶ (ug/L, total recoverable)	MDEL⁷ (ug/L, total recoverable)	AMEL⁸ (ug/L, total recoverable)
<15					Calculate			
15	2.25	1.77	2.34	1.84	0.75	0.97	2.3	1.2
16	2.39	1.87	2.49	1.95	0.80	1.03	2.5	1.2
17	2.53	1.97	2.64	2.05	0.85	1.08	2.6	1.3
18	2.67	2.07	2.78	2.16	0.89	1.14	2.8	1.4
19	2.81	2.17	2.93	2.26	0.94	1.19	2.9	1.5
20	2.95	2.26	3.07	2.36	0.99	1.24	3.1	1.5
21	3.09	2.36	3.22	2.46	1.03	1.30	3.2	1.6
22	3.23	2.46	3.36	2.56	1.08	1.35	3.4	1.7
23	3.37	2.55	3.51	2.66	1.13	1.40	3.5	1.7
24	3.50	2.65	3.65	2.76	1.17	1.45	3.6	1.8
25	3.64	2.74	3.79	2.85	1.22	1.50	3.8	1.9
26	3.78	2.83	3.93	2.95	1.26	1.56	3.9	2.0
27	3.91	2.93	4.08	3.05	1.31	1.61	4.1	2.0
28	4.05	3.02	4.22	3.14	1.35	1.66	4.2	2.1
29	4.19	3.11	4.36	3.24	1.40	1.71	4.4	2.2
30	4.32	3.20	4.50	3.33	1.45	1.76	4.5	2.2
31	4.46	3.29	4.64	3.43	1.49	1.81	4.6	2.3
32	4.59	3.38	4.78	3.52	1.54	1.86	4.8	2.4
33	4.73	3.47	4.93	3.62	1.58	1.91	4.9	2.5
34	4.86	3.56	5.07	3.71	1.63	1.96	5.1	2.5
35	5.00	3.65	5.21	3.80	1.67	2.00	5.2	2.6
36	5.13	3.74	5.35	3.90	1.72	2.05	5.3	2.7
37	5.27	3.83	5.49	3.99	1.76	2.10	5.5	2.7
38	5.40	3.92	5.63	4.08	1.81	2.15	5.6	2.8
39	5.53	4.01	5.77	4.17	1.85	2.20	5.8	2.9
40	5.67	4.09	5.90	4.26	1.90	2.25	5.9	2.9
41	5.80	4.18	6.04	4.35	1.94	2.29	6.0	3.0
42	5.93	4.27	6.18	4.45	1.98	2.34	6.2	3.1
43	6.07	4.35	6.32	4.54	2.03	2.39	6.3	3.1
44	6.20	4.44	6.46	4.63	2.07	2.44	6.4	3.2
45	6.33	4.53	6.60	4.72	2.12	2.48	6.6	3.3
46	6.47	4.61	6.74	4.80	2.16	2.53	6.7	3.4
47	6.60	4.70	6.87	4.89	2.21	2.58	6.9	3.4
48	6.73	4.78	7.01	4.98	2.25	2.63	7.0	3.5
49	6.86	4.87	7.15	5.07	2.29	2.67	7.1	3.6
50	6.99	4.95	7.29	5.16	2.34	2.72	7.3	3.6
51	7.13	5.04	7.42	5.25	2.38	2.77	7.4	3.7
52	7.26	5.12	7.56	5.34	2.43	2.81	7.5	3.8
53	7.39	5.21	7.70	5.42	2.47	2.86	7.7	3.8
54	7.52	5.29	7.83	5.51	2.51	2.90	7.8	3.9
55	7.65	5.37	7.97	5.60	2.56	2.95	8.0	4.0
56	7.78	5.46	8.11	5.68	2.60	3.00	8.1	4.0
57	7.91	5.54	8.24	5.77	2.65	3.04	8.2	4.1
58	8.04	5.62	8.38	5.86	2.69	3.09	8.4	4.2
59	8.17	5.71	8.52	5.94	2.73	3.13	8.5	4.2
60	8.31	5.79	8.65	6.03	2.78	3.18	8.6	4.3
>60					Calculate			

* Water Hardness (mg/L as CaCO₃). Because the Discharger discharges to a reservoir that serves as both the "upstream" and "downstream" receiving water, use hardness of reservoir water at the water treatment plant intake structure.

¹ CMC (1-hour average, acute) = 0.960 x e^{(0.9422)(ln hardness)-1.700}, from CTR Freshwater Aquatic Life (ug/L, dissolved)

² CCC (4-day average, chronic) = 0.960 x e^{(0.8545)(ln hardness)-1.702}, from CTR Freshwater Aquatic Life (ug/L, dissolved)

³ ECA_{acute} = CMC / 0.960, (ug/L, total recoverable)

⁴ ECA_{chronic} = CCC / 0.960, (ug/L, total recoverable)

⁵ LTA_{acute} = ECA_{acute} x 0.321 (ug/L, total recoverable), assumes CV=0.6 for 10 samples or less per SIP.

⁶ LTA_{chronic} = ECA_{chronic} x 0.527 (ug/L, total recoverable), assumes CV=0.6 for 10 samples or less per SIP.

⁷ MDEL = LTA x 3.11 (ug/L, total recoverable), where LTA equals the lowest of LTA_{acute} and LTA_{chronic}, assumes CV=0.6 for 10 samples or less per SIP for Aquatic Life.

⁸ AMEL = LTA x 1.55 (ug/L, total recoverable), where LTA equals the lowest of LTA_{acute} and LTA_{chronic}, assumes CV=0.6 for 10 samples or less per SIP for Aquatic Life.